REMARKS/ARGUMENTS

The Applicants would like to thank the Examiner for the careful consideration given the present application. The application has been carefully reviewed in light of the Office action, and amended as necessary to more clearly and particularly describe the subject matter in this application.

Applicants have incorporated limitations from claim 12 into amended claim 4. Additionally, Applicants have amended claims 10-12 to eliminate inconsistencies.

Claims 1-15 stand rejected under 35 U.S.C. 103(a) over Hidaka (U.S. Patent No. 6,320,369), hereinafter "Hidaka", in view of Ueda (U.S. Patent No. 5,285,155), hereinafter "Ueda". For at least the following reasons, the Examiner's rejection is respectfully traversed. The asserted combination of Hidaka and Ueda, does not teach, suggest, or otherwise render obvious or predictable the claimed invention.

The Examiner states that Hidaka fails to teach that the magnetic flux/feedback current conversion coefficient representing a ratio of a feedback current flow to a feedback coil with respect to a change amount of magnetic flux passing through the magnetic field sensor, and Applicants agree. However, the Examiner alleges that Ueda discloses a *magnetic flux-voltage* conversion coefficient and that one of ordinary skill in the art would recognize that the magnetic flux-voltage conversion coefficient is equivalent to Applicants' *magnetic flux/feedback current* conversion coefficient. However, the implementation of the coefficient in Ueda fails to have any similarities that would enable one of ordinary skill in the art to recognize that the two coefficients are equivalent.

Ueda discloses that a monotonously varying *portion* of the magnetic flux-voltage conversion coefficient is used in calculating a *feedback signal*. The monotonously varying portion of the magnetic flux-voltage conversion coefficient is used to obtain a judgment result. It is obtained by comparing the output signal from the superconductive loop of the SQUID to a signal corresponding to the point in a monotonously varying portion of the magnetic flux-voltage conversion coefficient function of the SQUID. A history of judgment results is then obtained by observing the results in a time sequential manner, where the history of judgment results is then used in computing the variation value component of the feedback signal. The feedback signal is then determined based on the latest judgment result and the varied variation value component. See col. 2, lines 52-68. Thus, the monotonously varying portion of the magnetic flux-voltage conversion coefficient is only a component of the feedback signal in Ueda. Furthermore, Ueda discloses that only a portion of the magnetic flux-voltage conversion coefficient is applicable in obtaining the feedback signal. Therefore, the portion magnetic flux-voltage conversion coefficient does correspond to a magnetic flux/feedback current conversion coefficient.

Accordingly, one of ordinary skill in the art would not use the portion magnetic flux-voltage conversion coefficient to determine a magnetic flux/feedback current conversion coefficient for measuring the beam current. As a result, the magnetic flux/feedback current conversion coefficient is not equivalent to the magnetic flux-voltage conversion coefficient as alleged by the Examiner. As Ueda and Hidaka fail to teach that the magnetic flux/feedback current conversion coefficient representing a ratio of a feedback current flow to a feedback coil with respect to a change amount of magnetic flux passing through the magnetic field sensor, the combination of Hadaka and Ueda fails to render claim 1 obvious.

Applicants also assert that Ueda teaches away from the claimed invention. Ueda discloses that only a portion of the magnetic flux-voltage conversion coefficient is necessary in

calculating a *feedback signal* to maintain the beam current. See col. 3, lines 9-17. Applicants are using more than just a portion of the magnetic flux/feedback current conversion coefficient; the entire magnetic flux/feedback current conversion coefficient is being used to accurately measure the beam current, as evidenced by the claimed value. Therefore, Ueda teaches away from the claimed invention.

In further reference to claim 1, the Examiner states that the combination of Hidaka and Ueda fails to teach wherein said magnetic field sensor has a magnetic flux/feedback current conversion coefficient of 8x10-15 Wb/A or above and alleges that the coefficient is a result effective variable and therefore involves only routine skill in the art to obtain. Applicants respectfully disagree.

In the specification of the published application (U.S. Patent Application No. 2006/0237660), Applicants conducted experiments to determine a beam measuring apparatus that is nondestructive with a high noise immunity. The experiments were necessary in determining how a beam current can be measured nondestructively while balancing the noise width and magnetic flux sensitivity. Having a noise width of a certain size (and related magnetic flux variation) makes the apparatus susceptible to noise where the SQUID could be unlocked. Applicants devised the experiments, determined initial values, and then conducted several experiments to establish a range of optimal operation. Only upon establishing a relationship between the magnetic flux/feedback current conversion coefficient and the beam current/voltage conversion coefficient was the optimal operation properties realized. Simple experimentation may be routine skill in the art, however, using the claimed magnetic flux/feedback current conversion coefficient ratio to establish a relationship to the beam current/voltage conversion coefficient is beyond routine skill in the art. See Fig. 3. Therefore, obtaining the value (8x10-15 Wb/A or above) that limited noise interference while maintaining sensitivity in the claimed

invention involves more than routine skill in the art. As this limitation is not disclosed by the prior art of record, claim 1 is not rendered obvious or predictable by the combination of Hidaka and Ueda.

Claims 2, 3, 7-11, and 13-15 depend directly or indirectly on claim 1, and thus are patentable for at least the same reasons as the parent claim.

Regarding claim 12, the Examiner alleged that the combination of Hidaka and Ueda disclosed a shielding and that one of ordinary skill in the art would interpret to include a gap. However, Applicant respectfully asserts that Hidaka discloses the opposite, stating "[T]he superconducting sampler circuit 11 is *completely covered* with the superconducting ground plane [shielding part] 19." See col. 13, lines 7-9. The phrase "completely covered" implies that the shielding part is uninterrupted in its coverage of the circuit and therefore, does not have a space or gap in the shielding part. Accordingly, one of ordinary skill in the art would not interpret the shielding to include a gap when Hidaka discloses the contrary. As Ueda fails to disclose a gap in the shielding, every limitation of claim 4 is not taught, suggested, or otherwise rendered obvious or predictable by the cited references Hidaka and Ueda.

Regarding claim 4, Applicants have amended claim 4 to include a limitation from claim 12. The limitation states that the "magnetism shielding part comprises a gap that receives the magnetic field". As argued above, the prior art of record fails to render claim 4 obvious as Hidaka discloses that the sampler circuit is completely covered. This is contrary to amended claim 4, and therefore, one of ordinary skill in the art would not interpret the shielding to include a gap. Thus, the combination of Hidaka and Ueda fails to teach, suggest or otherwise render obvious or predictable the claimed invention.

Regarding claims 5 and 6, because they depend directly on claim 4, they are patentable for at least the same reasons as the parent claim.

Claims 16-19 stand rejected under 35 U.S.C. 103(a) over Hidaka in view of Ueda, and in further view of Sferlazzo (U.S. Patent No. 5,133,074), hereinafter "Sferlazzo".

As claims 16 -19 depend from independent claim 1, and as the combination of Hidaka and Ueda fails to render claim 1 obvious, the addition of Sferlazzo also fails to teach, suggest or otherwise render obvious or predictable the claimed invention. As a result, the cited combination of Hidaka, Ueda and Sferlazzo fails to render claims 16-19 obvious.

In light of the foregoing, it is respectfully submitted that the present application is in a condition for allowance and notice to that effect is hereby requested. If it is determined that the application is not in a condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned agent to expedite prosecution of the present application.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 16-0820, our Order No.: NGB-38771.

Respectfully submitted,

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